

Appl. No. 10/058,214

Reply to Office Action of: March 24, 2005

**Amendments to the Claims**

This listing of claims will replace all prior versions and listings of claims in the application:

**Listing of claims:**

1. (currently amended) A method of providing a point multiple in an elliptic curve cryptosystem for performing cryptographic operations, said point multiple being derived from a scalar and a point on an elliptic curve having an equation of the form  $y^2 + xy = x^3 + a_1x^2 + 1$ , where  $a_1$  is either 0 or 1, said method comprising the steps of:
  - a) obtaining a pair of coefficients derived from a truncator of said elliptic curve;
  - b) computing a representation of said scalar from said pair of coefficients, said scalar, and said truncator of said elliptic curve;
  - c) computing said point multiple using said representation of said scalar and a Frobenius mapping  $\tau$ ; and
  - d) providing said point multiple to said elliptic curve cryptosystem for use in said cryptographic operations.
2. (original) A method according to claim 1, wherein said pair of coefficients corresponds to an approximation of the inverse of said truncator.
3. (original) A method according to claim 2, wherein said approximation is determined by a significance parameter.
4. (original) A method according to claim 1, wherein said representation of said scalar is equivalent to said scalar modulo said truncator.
5. (original) A method according to claim 2, further comprising the step of computing a quotient derived from said pair of coefficients and said scalar and using said quotient to perform the step of computing said representation of said scalar.

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6. (original) A method according to claim 5, wherein said quotient is equivalent to a product of said scalar and said approximation of said inverse of said truncator.
7. (original) A method according to claim 6, wherein said representation of said scalar is equivalent to a remainder after division of said scalar by said truncator.
8. (currently amended) A method according to claim 1, wherein said truncator is  $\frac{\tau^m - 1}{\tau - 1}$ ,  
wherein  $m$  is the extension degree of a finite field over which said elliptic curve is defined.
9. (currently amended) A method of computing a key for use in a cryptographic system, said key being derived from a scalar and a point on an elliptic curve having an equation of the form  $y^2 + xy = x^3 + a_1x^2 + 1$ , where  $a_1$  is either 0 or 1, said method comprising the steps of:
  - a) obtaining a pair of coefficients derived from a truncator of said elliptic curve;
  - b) computing a representation of said scalar from said pair of coefficients, said scalar, and said truncator of said elliptic curve;
  - c) computing [[said]] a point multiple using said representation of said scalar and a Frobenius mapping  $\tau[[.]]$ ; and
  - d) using said point multiple for computing said key for use in said cryptographic system.
10. (currently amended) In a method of computing an elliptic curve digital signature requiring a point multiple for use in a cryptographic system, the improvement comprising computing said point multiple by the steps of:
  - a) obtaining a pair of coefficients derived from a truncator of said elliptic curve;
  - b) computing a representation of said scalar from said pair of coefficients, said scalar, and said truncator of said elliptic curve;
  - c) computing said point multiple using said representation of said scalar and [[said]] an endomorphism of said elliptic curve  $[[.]]$ ; and

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d) using said point multiple for computing said elliptic curve digital signature for use in said cryptographic system.

11. (original) A data carrier containing computer executable instructions for performing a method according to claim 1.
12. (original) A cryptographic system performing a method according to claim 1.

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